UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. L4870

TWP NO. 332

OVER THE

ROOT RIVER

DISTRICT 6 - FILLMORE COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 144)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge L4870, the North and South Abutments, were found to be in satisfactory to fair condition below water. Random areas of section loss were observed along the submerged abutment walls with average penetrations of 12 inches and, in some instances, with exposed and corroded steel reinforcing. A section of the concrete facing was undermined along the South Abutment exposing the underlying masonry wall, which was in good condition.

INSPECTION FINDINGS:

(A) Undermining (1.5 feet vertical by 1.5 feet horizontal) of the concrete facing was observed at the South Abutment, exposing the underlying masonry wall (original construction) which was found to be in good condition.

(B) An area of poor consolidation was observed on the east corner of the South Abutment from 1.5 feet below to 1 foot above the waterline with 3 inches of maximum penetration. A formed steel angle was exposed due to an area of section loss, up to 1 foot wide and 4 inches deep, on the west corner of the South Abutment that extended from 3 feet above to 2 feet below the waterline.

(C) Random areas of section loss were observed on the submerged walls at both abutments with average penetrations of 12 inches. At the center of the South Abutment, exposed and corroded steel reinforcement was observed below water at an area of section loss.

RECOMMENDATIONS:

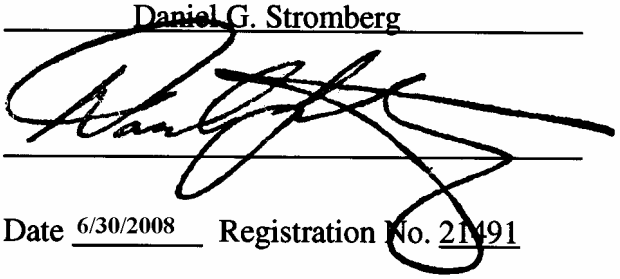
(A) Recast the areas of section loss in the concrete facing, especially those with exposed reinforcement, with a concrete mix which provides a high durability and low permeability.

(B) Monitor height of exposure and condition of the masonry wall exposed below the concrete facing at the South Abutment, and if deterioration continues, further concrete encasement may be required.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

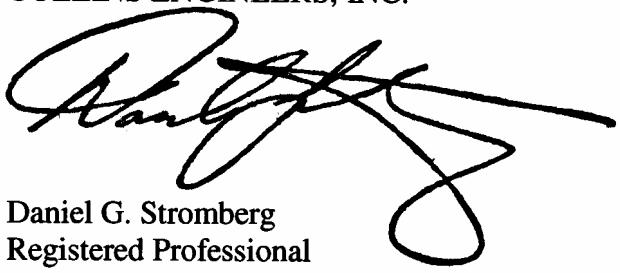
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: L4870

Feature Crossed: Root River

Feature Carried: TWP No. 332

Location: District 6 - Fillmore County

Bridge Description: The superstructure consists of a single span, multiple steel stringer structure supporting a timber deck. The superstructure is supported by two masonry stone/concrete faced abutments. No design drawings or plans were available for this bridge; therefore, the type of substructure foundation is not known.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 24, 2007

Weather Conditions: Sunny, 58°F

Underwater Visibility: 2 feet

Waterway Velocity: 3 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The North and South Abutments.

General Shape: The abutments consist of a masonry breastwall covered by a concrete facing with two adjoining skewed wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 4.5 feet.

4. WATERLINE DATUM

Water Level Reference: The bottom of the outermost steel stringer on the east side of the North Abutment.

Water Surface: The waterline was approximately 8.6 feet below reference.
Assumed Waterline Elevation = 91.4.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/10/07

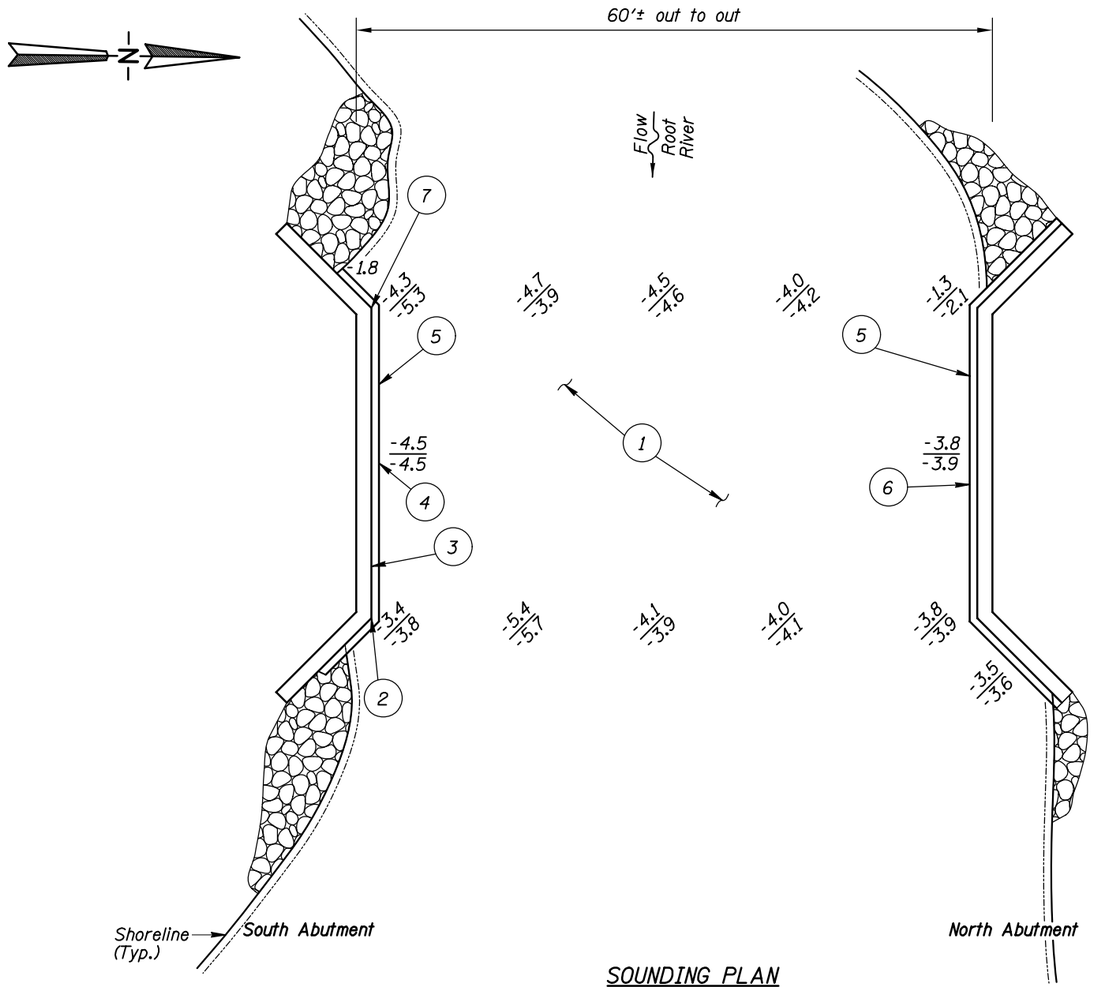
Item 113: Scour Critical Bridges: Code G/92

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No

Photograph 1. View of North Abutment, Looking Northeast.

Photograph 2. View of South Abutment, Looking Southeast.



SOUNDING PLAN

GENERAL NOTES:

1. The North and South Abutments were inspected underwater.
2. At the time of inspection on October 24, 2007, the waterline was located approximately 8.6 feet below the bottom of the outermost steel stringer on the downstream end of the North Abutment. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 91.4.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES

(1) The channel bottom consisted of riprap with no probe rod penetration.

(2) An area of poor consolidation was observed on the east corner of the South Abutment from 1.5 feet below to 1 foot above the waterline with 3 inches of maximum penetration.

(3) A 6 inch band of poorly consolidated concrete was observed at the waterline extending from the downstream 1/4 point to the east wingwall.

(4) The upstream half of the South Abutment concrete wall facing exhibited undermining that was 1.5 feet high with up to 1.5 feet of penetration, which exposed the underlying masonry. Random areas of section loss were observed on the submerged portion of the South Abutment facing with average penetrations of 6 inches which exposed heavily corroded vertical reinforcing steel at the center of the abutment.

(5) A concrete ledge was located at 1.7 feet below the waterline at the South Abument and 1.8 feet below the waterline at the North Abutment.

(6) Random areas of section loss were observed on the submerged portion of the North Abutment with average penetrations of 12 inches and no exposed reinforcing steel detected.

(7) A formed steel angle was exposed due to an area of section loss, up to 1 foot wide and 4 inches deep, on the west corner of the South Abutment which extended from 3 feet above to 2 feet below the waterline.

Legend

-2.8 Sounding Depth (10/24/07)
-2.9 Sounding Depth (10/3/02)

Riprap

Note:

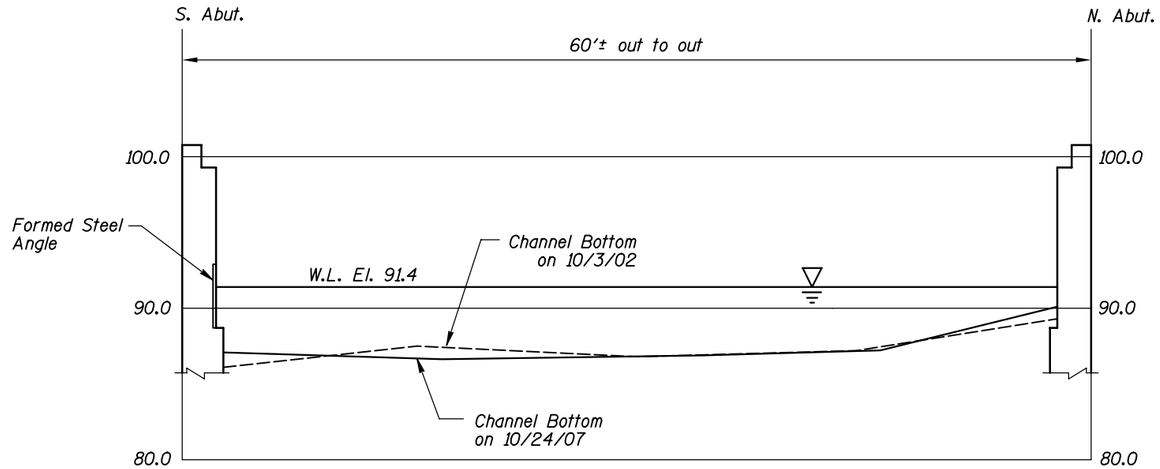
All soundings based on 2007 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

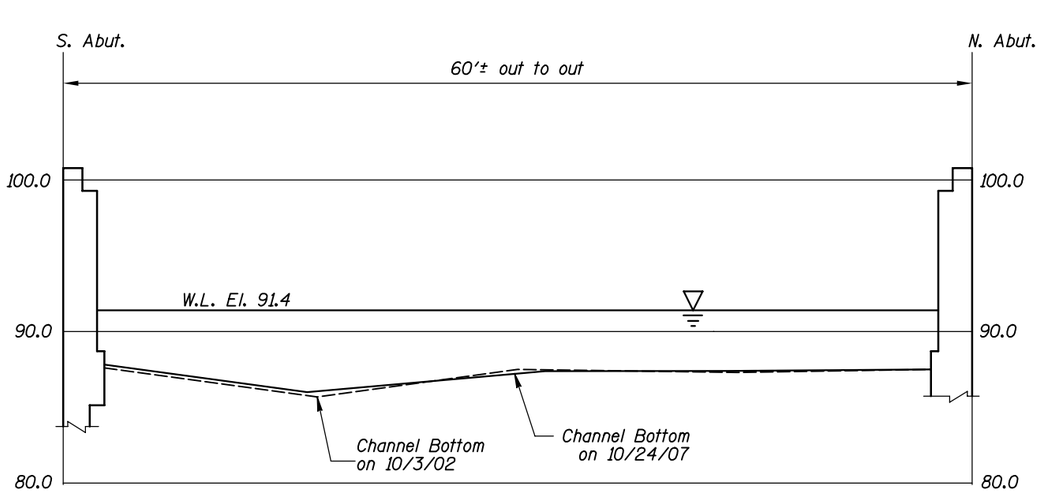
STRUCTURE NO. L4870
OVER THE ROOT RIVER
DISTRICT 6, FILLMORE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: MDK	COLLINS ENGINEERS, INC 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS		Scale: NTS
Code: 52210144		Figure No.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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OVER THE ROOT RIVER
DISTRICT 6, FILLMORE COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: MDK	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS		Scale: NTS (U.O.N.)
Code: 35120144		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 24, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: L4870 WEATHER: Sunny, 58°F

WATERWAY CROSSED: Root River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, Scraper, Sounding Pole, Camera, Probe Rod, U/W Light

TIME IN WATER: 4:15 p.m.

TIME OUT OF WATER: 4:45 p.m.

WATERWAY DATA: VELOCITY 3.0 f.p.s

VISISBILITY 2.0 feet

DEPTH 4.5 feet maximum at the South Abutment

ELEMENTS INSPECTED: The North and South Abutments

REMARKS: The concrete facing over the original stone masonry abutment walls was in fair condition below water. Random areas of section loss were observed on the abutment wall facings with average penetrations of 12 inches, and in some areas on the South Abutment, exposed and heavily corroded reinforcing steel was also observed. In addition, the concrete facing was undermined at the South Abutment exposing the underlying masonry, which was in good condition and extended to the channel bottom. A formed steel angle was exposed due to an area of section loss, up to 1 foot wide and 4 inches deep, on the west corner of the South Abutment extending from 3 feet above to 2 feet below the waterline.

FURTHER ACTION NEEDED: X YES _____ NO

Recast the areas of section loss in the concrete facing, especially those with exposed reinforcement, with a concrete mix which provides a high durability and low permeability.

Monitor height of exposure and condition of the masonry wall exposed below the concrete facing at the South Abutment, and if deterioration continues, further concrete encasement may be required.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. L4870
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Root River

INSPECTION DATE October 24, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	North Abutment	3.8’	N	6	N	7	N	6	7	N	N	N	7	6	N	N	N	N	N
	South Abutment	4.5’	N	5	N	7	N	5	6	N	N	N	6	5	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The concrete facing over the original stone masonry abutment walls was in fair condition below water. Random areas of section loss were observed on the abutment wall facings with average penetrations of 12 inches, and in some areas on the South Abutment, exposed and heavily corroded reinforcing steel was also observed. In addition, the concrete facing was undermined at the South Abutment exposing the underlying masonry, which was in good condition and extended to the channel bottom. A formed steel angle was exposed due to an area of section loss, up to 1 foot wide and 4 inches deep, on the west corner of the South Abutment extending from 3 feet above to 2 feet below the waterline.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.